Patent Claims

1. A method for controlling a brake pressure in at least one wheel brake mounted on a vehicle axle during a braking operation on a road surface having heterogeneous coefficients of friction, characterized in that
   - a low coefficient of friction side and/or a high coefficient of friction side of the vehicle is detected,
   - a stability index representing a driving state of the vehicle is formed,
   - the stability index is evaluated on the basis of the low coefficient of friction side and/or the high coefficient of friction side and
   - the brake pressure in at least one wheel brake is modified as a function of the value of the stability index and as a function of a result of the evaluation of the stability index on the basis of the low coefficient of friction side and/or the high coefficient of friction side.

2. The method according to Claim 1, characterized in that an ABS control method is employed for a wheel on the low coefficient of friction side and a brake pressure difference [between] the brake pressures in the wheel brake on the high coefficient of friction side and in the wheel brake on the low coefficient of friction side is determined, whereby the wheel brakes are preferably mounted on one vehicle axle.

3. The method according to any one of Claims 1 and 2, characterized in that the stability index is formed as a function of a steering angle on the steerable wheels of the vehicles and/or a yaw rate of the vehicle.

4. The method according to any one of the preceding claims, characterized in that the stability index is formed on the basis of a deviation between an instantaneous steering angle and a steering angle prevailing at the start of a braking

operating on a road surface having a heterogeneous coefficient of friction.

5. The method according to any one of the preceding claims, characterized in that the stability index is determined on the basis of a deviation between an instantaneous yaw rate of the vehicle and a reference yawl rate determined in a vehicle model on the basis of the steering angle prevailing at the start of the braking operation.

6. The method according to any one of the preceding claims, characterized in that the stability index is determined as the function of a deviation between a steering angle commanded by the operator of the vehicle and a nominal steering angle set on the steerable wheels of the vehicle.

7. The method according to any one of the preceding claims, characterized in that the nominal angle steering angle contains a control component which is determined in a vehicle model as a function of an interfering yaw torque in a vehicle model.

8. The method according to any one of the preceding claims, characterized in that the nominal steering angle contains a control component which is determined as a function of the yaw rate deviation between the yaw rate of the vehicle and a reference yaw rate of the vehicle.

9. The method according to any one of the preceding claims, characterized in that the stability index is formed as a function of a deviation between a yaw rate of the vehicle and a nominal yaw rate determined in a vehicle model on the basis of at least one parameter preselected by the operator of the vehicle.

10. The method according to any one of the preceding claims, characterized in that the stability index is determined as a function of a lateral acceleration of the vehicle.

11. The method according to any one of the preceding claims, characterized in that the stability index is determined as a function of a sideslip angle and/or a sideslip angle velocity.

12. The method according to any one of the preceding claims, characterized in that a plus or minus sign of the stability index is determined as a function of the low coefficient of friction side and/or as a function of the high coefficient of friction side.

13. The method according to any one of the preceding claims, characterized in that the brake pressure is modified as a function of the result of a comparison of the stability index with at least one threshold value.

14. The method according to any one of the preceding claims, characterized in that the brake pressure in the wheel brake on the high coefficient of friction side is increased in comparison with the brake pressure in the wheel brake on the low coefficient of friction side when the stability index exceeds a predetermined threshold value.

15. The method according to any one of the preceding claims, characterized in that the brake pressure difference between the brake pressure in the wheel brake on the low coefficient of friction side and the brake pressure in the wheel brake on the high coefficient of friction side is limited.

16. The method according to any one of the preceding claims, characterized in that the brake pressure difference is limited as a function of the speed of the vehicle.

17. The method according to any one of the preceding claims, characterized in that no brake pressure difference is allowed when the low coefficient of friction side and/or the high coefficient of friction side change(s).

18. The method according to any one of the preceding claims, characterized in that a brake pressure difference on the rear axle is limited to a predetermined component of a brake pressure difference on the front axle.

19. The method according to any one of the preceding claims, characterized in that the brake pressure ratio on the rear axle is limited to a predetermined component of the brake pressure ratio on the front axle.

20. The method according to any one of the preceding claims, characterized in that a change in the brake pressure is performed when it is detected that the vehicle is driving straight ahead.

21. The method according to any one of the preceding claims, characterized in that a slower pressure increase is implemented when turning and a faster pressure increase is implemented [when driving straight ahead?],[1] and the brake pressure difference and/or the brake pressure ratio of the rear axle is limited in a more restrictive manner.

22. The method according to any one of the preceding claims, characterized in that turning is performed by means of a turn index obtained from the yaw rate, the steering angle and the lateral acceleration.

23. Device for controlling the brake pressure difference between the brake pressure in a wheel brake on a low coefficient of friction side and the brake pressure in the wheel brake on the high coefficient of friction side of a vehicle during a braking operation on a road surface having a heterogeneous coefficient of friction, comprising

- a detection means for detecting the low coefficient of friction side and/or the high coefficient of friction side,

[1] Translator's note: The phrase "bei Kurvenfahrt" ("when turning") appears twice in a row at the beginning of the second part of the claim but there is no comparable phrase for the "pressure reduction" part of the claim.

- a determination means for determining a stability index representing a driving state of the vehicle,
- an evaluation means for evaluating the stability index on the basis of the low coefficient of friction side and/or the high coefficient of friction side as detected in the detection means,
- a calculation means for determining the brake pressure difference as a function of the value of the stability index and the result of the evaluation of the stability index on the basis of the low coefficient of friction side and/or the high coefficient of friction side.

24. The device according to Claim 20, characterized in that it includes an ABS controller that controls the brake pressure in the wheel brake on the low coefficient of friction side.

25. The device according to any one of Claims 20 and 21, characterized in that it has a memory means for storage of a steering angle prevailing at the start of the braking operation on the steerable wheels of the vehicle.

26. The device according to any one of Claims 20 through 22, characterized in that it has a first steering angle comparator means for comparing a steering angle measured with a steering angle sensor with the steering angle saved in the memory means.

27. The device according to any one of Claims 20 through 23, characterized in that it has a first yaw rate comparator means for comparing a yaw rate of the vehicle measured with a yaw rate sensor with a reference yawl rate calculated in a vehicle model on the basis of the stored steering angle.

28. The device according to any one of Claims 23 and 24, characterized in that the determination means for determining the stability index on the basis of the results of the comparison performed in the first steering angle comparator

means and/or the comparison performed in the first yaw rate comparator means.

29. The device according to any one of Claims 20 through 24, characterized in that it has a steering angle controller for determining a nominal steering angle.

30. The device according to Claim 26, characterized in that the steering angle controller comprises means for determining a controlling component of the nominal steering angle as a function of an interfering yawing torque.

31. The device according to any one of Claims 26 and 27, characterized in that the steering angle controller comprises a means for determining a control component of the nominal steering angle on the basis of a deviation in the measured yaw rate of the vehicle from a reference yaw rate.

32. The device according to any one of Claims 26 through 28, characterized in that it comprises a means for adjusting the nominal steering angle.

33. The device according to Claim 29, characterized in that the means for adjusting the nominal steering angle is a superpositioning steering.

34. The device according to Claim 29, characterized in that the means for adjusting the nominal steering angle is a steer-by-wire steering.

35. The device according to any one of Claims 26 through 31, characterized in that it has a second steering angle comparator means for comparing the nominal steering angle with a steering angle commanded by the driver.

36. The device according to any one of Claims 26 through 32, characterized in that it has a second yaw rate comparator means for comparing the measured yaw rate of the vehicle with

a reference yaw rate calculated in a vehicle model on the basis of the steering angle commanded by the driver.

37. The device according to any one of Claims 32 and 33, characterized in that the determination means for determining the stability index accesses the results of the comparison performed in the second steering angle comparative means and/or the comparison performed in the second yaw rate comparative means.